

REMARKS

Claims 25 and 26 have been added. Claims 12 - 26 are pending in the present application. The subject matter of the various claims was commonly owned at the time of the invention because all inventors were regular employees of the Applicant at that time of the invention and obligated to assign any patent application to the Applicant.

Claim rejections 35 USC §103

Claims 12-23 have been rejected as being unpatentable over Takaku et al. in view of applicant's admitted prior art or alternatively over Nishimura et al in view of applicant's admitted prior art. The Examiner states that Takaku or Nishimura teach all the limitations of claims 12-23 except the internal EGR. Applicant respectfully disagrees. The present invention is directed to the problem that in a layered lean operation of a combustion engine the incoming gas will not be thoroughly mixed with gas remaining in the cylinder by internal exhaust gas recirculation. Applicant amended the independent claims 12 and 24 to more clearly define the present invention. According to the amended independent claims, the combustion engine is operated in such a way that the charging movement of the piston in combination with the provision of a swirl in incoming gas having a swirl axis substantially transverse to said piston axis causes an intermixture of residual exhaust gas with said incoming gas. Takaku et al. or Nishimura et al. do not provide for an internal exhaust gas recirculation and therefore will not be confronted with this problem. The swirl control valve is merely used to intermix the external recirculated exhaust gas with the incoming air. A combination of Takaku or Nishimura and the admitted prior art would merely result in a layered lean operation in which the incoming gas is intermixed with the external recirculated gas but still layered within the cylinder of the engine.

In addition, Applicant presents new independent claims 25 and 26 which further define the means for controlling the swirl, namely the tumble plate, within the intake channel of the combustion engine. These independent claims 25 and 26 are based on the former independent claims 12 and 24. The operation and arrangement of the tumble plate is disclosed in the originally submitted English specification on page 10, paragraph [0025]. These independent claims 25 and 26 now include the limitation that the swirl control means are provided by a

controllable tumble plate which can be laid against a wall of said inlet channel to allow incoming gas to pass by or can be set to provide swirl in incoming gas having a swirl axis substantially transverse to said piston axis and, thus, arranged to cause an intermixture of residual exhaust gas with said incoming gas.

Takaku does not disclose such a specific tumble plate. On the contrary, Takaku discloses a swirl control valve. Hence, if the control valve is laid against a wall of the intake channel by turning the valve, the complete flow of incoming gas is stopped because the valve closes. Thus, this valve cannot allow uninfluenced passage of incoming gas like the arrangement according to the present invention.

Similarly to Takaku, Nishimura merely discloses a air stream control valve which operates differently than the tumble plate according to the present application. Again, contrary to the definition as presented in claims 25 and 26 this valve closes when it is set to touch the intake channel wall. When the valve is open it will, however, influence the gas flow in some manner. The present invention, however, provides to control the tumble plate to be laid against the intake channel wall, thus, allowing the incoming gas to pass by.


Dependent claims 13-23 include all the limitations of independent claim 12 and are therefore patentable at least to the extent of independent claim 12. However, these claims include further limitations not shown in any of the cited references. For example, claim 14 provides that a tumble plate is provided in the gas inlet. Neither Takaku or Nishimura provide for a tumble plate as both merely provide for swirl valves.

CONCLUSION

The application as defined in the pending claims is patentable under 35 U.S.C. §102 and §103 in view of the cited prior art. Therefore, applicants respectfully request withdrawal of the rejection and allowance of all pending claims.

Applicants do not believe that any other fees are due at this time; however, should any fees under 37 C.F.R. §§ 1.16 to 1.21 be required for any reason relating to this document, the Commissioner is authorized to deduct the fees from Deposit Account No. 02-0383, (*formerly Baker & Botts, L.L.P.*,) Order Number 070255.0624.

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